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SIMULTANEOUS EXCITATION OF PARAMETRIC DECAY CASCADES AND THE OTSI IN 1D NUMERICAL SIMULATIONS BASED ON ZAKAROV'S EQUATIONS

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6 AUTHOR(S)
R. A. Sprague and J. A. Fejer

7 PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
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RDT&E Division
San Diego, CA 92152-5001

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13 ABSTRACT *(Maximum 200 words)*

This presentation describes results from numerical simulations based on Zakarov's equations. These results show, that for relatively low pump pressures, the OTSI is stabilized by the presence of the cascade and thus can coexist with the cascade.

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R. A Sprague	(619) 553 – 3064	Code 542

SIMULTANEOUS EXCITATION OF PARAMETRIC DECAY CASCADES AND THE OTSI IN 1D NUMERICAL SIMULATIONS BASED ON ZAKAROV'S EQUATIONS

R.A. Sprague
NCCOSC RDTE DIV, CODE 542
San Diego, CA 92152-5235
AND
J.A. Fejer
Department of Electrical and Computer Engineering
University of California, San Diego
La Jolla, CA 92093

Plasma wave spectra observed during ionospheric heating experiments are generally classified as being of two main types, the 'cascade' type or the 'broad' type, although instances of the apparent co-existence of the two types is also observed. Cascade type spectra are thought to be produced by the parametric decay of the heating (pump) wave into lower frequency Langmuir waves and low frequency ion acoustic-like density oscillations. Broad type spectra are believed to be produced by the repeated cycle of nucleation, collapse and burnout of localized density depletions. The physical processes involved in the two cases are thus quite different.

A feature of the cascade type spectra which is often observed under particular experimental conditions is a narrow bandwidth, zero frequency offset 'line'. This feature is thought to be produced by the 'purely growing' or 'oscillating two-stream (OTSI)' instability which is known to be excited under conditions similar to those which produce the cascade. In this paper we present results from numerical simulations, based on Zakarov's equations, which show that, for relatively low pump powers, the OTSI is stabilized by the presence of the cascade and thus can co-exist with the cascade. Examples of both frequency and wavenumber spectra will be presented, along with plots showing the evolution of the total power in the Langmuir spectrum.

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